

Unmanned VTOL Aerial System and Airspace Modeling Statement of Work

Introduction

Unmanned vehicle operations are becoming more important in the execution of Department of Defense operations and are being proposed for important civilian applications. These experiences are creating a significant push to enable use within the national airspace system. The opportunity for vertical takeoff and landing (VTOL) capable unmanned aircraft present still further airspace utilization opportunities and challenges.

Scope

To meet the long-term need to enable integration of unmanned VTOL aerial vehicles into the national airspace system, new approaches and technologies must be developed and accessed, including automation challenges. This task enables preliminary assessments of procedures, protocols, and actions to assess the needs and opportunities for assessing future technology directions. In addition, operational effectiveness measures shall be developed for both civilian and military mission scenarios.

Tasks

Task 1. Scenario Assessments

The contractor shall enhance/develop both fixed wing and VTOL prototype aircraft mission modeling and assessment tools to provide a reasonable framework for characterizing operation of unmanned VTOL aerial systems in the national airspace, including human operation modeling for both platform and airspace operation. Both military and civilian missions shall be modeled.

- a) Using scenario timeline from the Government, perform all needed functions. Determine functions that need to be added to existing modeling assessment tools.
- b) Supervise functional evaluation (develop differences training document, schedule SME and laboratory, determine procedures, document results).
- c) Effectiveness analysis metrics shall be developed to provide for suitable mission assessment evaluation capability.

Scenario Assessment Report Deliverable: Documentation of testing procedures, results and recommendations shall be delivered to the Government within 3 months of task initiation.

Task 2. Modeling Requirements

The contractor shall conceptualize, characterize and define the necessary modeling requirements for conducting comprehensive assessments.

- a) Define modeling requirements to satisfactorily substantiate Government-provided mission scenarios. This should include training, data collection, hardware, etc.

Modeling Requirements Report Deliverable: Documentation of requirements including protocols, training, and scheduling shall be provided to Government within 6 months of task initiation.

Task 3. Support/Conduct Simulation Experiments and Studies

The contractor shall provide all documents to prepare, execute, and report findings from focused experiments and studies using accepted scientific methods and procedures.

- a) Develop experimental test plans that shall enable accurate assessments of existing, modified, or new technical solutions to enabling new emerging capabilities in platform, mission, or airspace capabilities.
- b) Perform an operator in the loop simulation of prescribe missions with UAV operators (or if unavailable Government test pilots).
- c) Analyze data.
- d) Document results.

Experiment Data Report Deliverable: Documentation of test procedures, data, results, and recommendations shall be delivered to Government within 9 months of task initiation.

Task 4. Support connectivity demonstration with airspace operation simulation model (coordinate with Government simulation and modeling personnel).

Connectivity Demonstration Report Deliverable: Documentation of requirements including protocols, training, and scheduling shall be provided to Government within 10 months of task initiation.

Task 5. Develop unmanned VTOL aerial vehicle operations development plan for a Government provided VTOL-class vehicle and prescribed mission, including documentation of procedure, data, results and specific recommendations form this study.

VTOL Operations Development Plan Deliverable: A Draft Plan documenting the development plan, the analysis tools used, the modeling methodology, and the major findings of the analyses performed shall be provided within 10 months of task initiation. The Government shall provide review and comments. A Final Report shall be submitted to the Government within 12 months of task initiation.

Deliverables Summary

- Task 1: Scenario Assessment Report Deliverable shall be delivered to the Government within 3 months of task initiation.
- Task 2: Modeling Requirements Report shall be provided to Government within 6 months of task initiation.
- Task 3: Experiment Data Report shall be delivered to Government within 9 months of task initiation.

- Task 4: Connectivity Demonstration Report shall be provided to Government within 10 months of task initiation.
- Task 5: VTOL Operations Development Plan shall be provided within 10 months of task initiation. A Final Report shall be submitted to the Government within 12 months of task initiation.

Travel

Three trips of two days duration for one person are anticipated to conduct task status reviews and present research findings to the Government at NASA Ames Research Center.

Period of Performance

All work is to be completed within 12 months of task initiation.

Place of Performance

The work will be performed at the contractor's facilities.